IGCSE CHEMISTRY

Test on Metals

Q.1 Zinc and copper are elements next to each other in the Periodic Table.

(a) Zinc is obtained from zinc blende in a two-step process.

Outline how each of these steps are done.

step 1 .....

.....

chemical equation .....

step 2 .....

.....

chemical equation .....

removal of zinc in **step 2** .....

.....[5]

(b) Name the alloy formed when zinc is mixed with copper.

..... [1]

(c) Copper is a transition element. It can have variable oxidation states.

State **two** other chemical properties of transition elements which make them different from Group I elements.

1 .....

2 .....[2]

(d) A compound of copper can be used to test for water.

(i) State the full name of this compound of copper.

..... [1]

(ii) State the colour change that occurs when water is added to this compound of copper.

from ..... to .....

[2]

(e) Aqueous potassium iodide reacts with aqueous copper(II) sulfate to produce iodine.

(i) Balance the chemical equation for this reaction.

KI + $CuSO_4$ ---→CuI + I_2 + K_2SO_4 [2]

(ii) Deduce the charge on the copper ion in CuI.

..... [1]

(iii) In terms of electron transfer, explain why copper is reduced in this reaction.

..... [1]

(iv) Identify the reducing agent.

..... [1]

This question is about iron and iron compounds.

Q 2. (a) Name the main ore of iron.

..... [1]

(b) In a blast furnace used for the extraction of iron, carbon reacts with oxygen from the air to form carbon monoxide.

Complete the chemical equation for this reaction.

....C + ... --→2CO [2]

(c) In the hotter parts of the furnace, carbon reacts with the iron(III) oxide present in the iron ore.

3C + Fe_2O_3----→ 3CO + 2Fe

How does this equation show that carbon is oxidised?

.....

..... [1]

(d) Limestone is added to the blast furnace. The limestone is converted into calcium oxide and carbon dioxide. The reaction is endothermic.

$CaCO_3 \longrightarrow CaO + CO_2$

(i) What type of chemical reaction is this?

..... [1]

(ii) What type of oxide is calcium oxide?

Give a reason for your answer.

.....

..... [2]

(e) Iron is a metal.

Give **three** physical properties that are characteristic of metals.

1 .....

2 .....

3 .....[3]

Q 3. Aluminium is extracted from aluminium oxide by electrolysis.

(a) Why is aluminium **not** extracted by heating aluminium oxide with carbon?

.....

..... [1]

(b) Aluminium oxide is an ionic compound with a high melting point.

(i) Complete the dot-and-cross diagram to show the electron arrangement in **one** of the oxide ions present in aluminium oxide. Include the charge on the oxide ion.

(ii) The melting point of aluminium oxide is above 2000 °C.

Explain why aluminium oxide has a high melting point.

.....

.....

..... [2]

(c) Aluminium can be extracted by electrolysis

(i) Name the type of particle responsible for the transfer of charge in

the wires, ...

the electrolyte. .....[2]

(ii) Give **two** reasons why cryolite is used.

1 .....

2 .....[2]

(iii) Write the ionic half-equation for the formation of aluminium during the electrolysis.

..... [1]

(iv) Explain how carbon dioxide gas is formed at the anodes.

.....

.....

..... [3]